



Global warming, climate variability and Atlantic hurricanes

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Conference:	American Meteorological Society's 28th Conference on Hurricanes and Tropical Meteorology held 28 April-02 May 2008 (Orlando, FL)
Year:	2008
Publisher:	American Meteorological Society (AMS)

Abstract:

Presentation in Session 5B, Hurricanes and Climate III: Long-Term Variability at conference. Atlantic hurricane activity is influenced by global warming and natural climate phenomena in the Pacific, Indian and Atlantic Oceans. Here I use observational data to show that global warming of the sea surface is associated with a secular increase of tropospheric vertical wind shear in the main development region (MDR) for Atlantic hurricanes. The increased wind shear coincides with a downward trend in U.S. landfalling hurricanes, a reliable measure of hurricanes over the long term. Warmings in the tropical Pacific/Indian and North Atlantic Oceans produce opposite effects upon vertical wind shear, e.g., warming in the Pacific/Indian Oceans increases vertical wind shear, while warming in the North Atlantic decreases vertical wind shear. Overall, warming in the Pacific/Indian Oceans is of greater impact and produces increased levels of vertical wind shear which could result in fewer U.S. landfalling hurricanes. The relative role induced by secular warmings over the tropical oceans is key to determining whether future global warming will increase the vertical wind shear in the MDR for Atlantic hurricanes. The impact of ENSO events is that El Nino (La Nina) decreases (increases) Atlantic hurricane activity. The influence of the Atlantic multidecadal oscillation on Atlantic hurricanes is to operate through the mechanism of the atmospheric changes induced by the Atlantic warm pool (AWP). The AWP-induced changes related to Atlantic hurricanes include a dynamical parameter of vertical wind shear and a thermodynamical parameter of convective instability. An anomalously large (small) AWP reduces (enhances) the vertical wind shear in the MDR and increases (decreases) the moist static instability of the troposphere, both of which favor (disfavor) Atlantic hurricane activity.

Source: <https://ams.confex.com/ams/28Hurricanes/webprogram/Paper137874.html>

Resource Description

Exposure : ☒

weather or climate related pathway by which climate change affects health

Extreme Weather Event, Temperature

Extreme Weather Event: Hurricanes/Cyclones

Geographic Feature: ☒

resource focuses on specific type of geography

Climate Change and Human Health Literature Portal

Ocean/Coastal

Geographic Location:

resource focuses on specific location

United States

Health Impact:

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Resource Type:

format or standard characteristic of resource

Multimedia, Review

Timescale:

time period studied

Time Scale Unspecified